REMARKS

Reconsideration and allowance of the present application are respectfully requested. Claims 1-10 remain pending in the application. By this amendment, a replacement Abstract is provided; and claims 1, 8 and 9 are amended. No new matter is added.

In numbered paragraph 1, page 2 of the Office Action, the Examiner points out a spelling error in claim 1 and requests Applicants to carefully review the disclosure. To address the Examiner's concerns, Applicants have corrected the spelling error in claim 1 and reviewed the disclosure. Applicants respectfully submit that the corrections have been made.

In numbered paragraph 2, page 2 of the Office Action, the Examiner objects to the abstract. To address the examiner's concerns, a replacement Abstract is provided for separate placement after the last page. Withdrawal of the objection to the abstract is respectfully requested.

In numbered paragraph 3, pages 2-4 of the Office Action, independent claims 1 and 9, along with all dependent claims, are rejected as being anticipated by U.S. Patent 5,712,802 (Kumar et al.). This rejection is respectfully traversed.

The Kumar et al. patent relates to thermal protection of semiconductor components without direct measurement of semiconductor temperature. In the Kumar et al. patent a thermal protection is provided based on a threshold allowable temperature. This threshold limitation of temperature is based on limiting the power dissipation in the semiconductor component so that the highest allowable temperature is not exceeded (col. 3, lines 20-43). In column 7, lines 42-45, the Kumar et al. patent discloses that the purpose of its disclosure is to eliminate the

need for separate heat sink thermistors and temperature conversion circuitry. The Kumar et al. patent uses real-time calculation for calculating the temperature. Then, the inverter output power becomes limited if the calculation of temperature shows that the temperature may rise above design limits (col. 8, lines 12-17).

The Kumar et al. patent merely relates to limiting the maximum temperature of power semiconductor components. The maximum temperature of the semiconductor components, which is the focus of the Kumar et al. disclosure, is a design parameter set as a threshold not be exceeded. In the Kumar et al. patent, if this temperature is exceeded, the component is usually damaged. Thus all measures in the Kumar et al. patent are directed to simply limiting the maximum temperature. Those measures include, in Kumar et al. patent, limiting the output power and controlling the volumetric air flow rate (col. 3, lines 24-25).

If, arguendo, the above Kumar et al. measures were to have been used in connection with a cyclically used frequency converter, the measures would not have been workable. The problem with the known maximum temperature limiting methods is that these methods merely take account the temperature maximum that should not be exceeded, and do not take into account the problem of premature wearing of the components due to cyclic use of the frequency converter.

As Applicants have observed, in a cyclic use, the inverter is loaded heavily for a certain period after which the load is reduced. These cycles are again repeated. As Applicants have discovered, the semiconductor components are subjected to thermal expansions which wear the components when the temperature changes in connection with the load cycles. Applicants have solved the above problem as featured in Applicants' independent claims.

In contrast, the Kumar et al. patent would not have taught or suggested that when the temperature or some electrical quantity affecting the temperature increases, the temperature increase rate is slowed down and that when the temperature or some electrical quantity affecting the temperature decreases, the temperature decrease rate is slowed down.

The Kumar et al. patent would not have anticipated, for example, that when a frequency converter operates in a normal operating point in steady state, meaning that the temperature of the components have settled to a substantially constant temperature, which is not near the highest maximum; then the load is changed. The Kumar et al. patent does not relate to decreasing the rate of temperature change. Specifically, the Kumar et al. patent would not have changed the rate of temperature change under these kinds of normal operating temperatures, because they would not have been near the maximum threshold.

The method of the invention does not require any specific control of the load. As an example, where first the load is reduced, then the temperature decreases and the method of the invention slows down the decrease rate. Further, in the example, if the load is increased, then the temperature also increases. The method of the invention slows down the increase rate.

The methods which limit only the highest temperatures (as Kumar et al) do not react on these changes when the temperature stays below a threshold limit. The Kumar et al. patent does relate to changing the rate of change, but rather would have kept the temperature as is, since the temperatures are not close to the critical level. The Kumar et al. patent would not have taught or suggested controlling with the control apparatus the power semiconductor components in response to both a

control quantity to generate an output voltage and the change rate of the temperature or a quantity affecting the temperature of the power semiconductor components to reduce temperature variation by slowing down a temperature increase rate as the temperature or the electric quantity affecting the temperature increases and by slowing down a temperature decrease rate as the temperature or the electric quantity affecting the temperature decreases, as recited in Applicants' claim 1, and as similarly recited in claim 9.

Thus, Applicants' claimed method and arrangement encompasses features that react to the relative temperature changes, whereas the Kumar et al. patent is directed to a different problem of merely triggering based on a threshold value of the temperature. Accordingly, contrary to the Examiner's assertions, the Kumar et al. patent relates to a completely different problem, and does not relate to the problems addressed by Applicants' claimed features. The Kumar et al. patent does not relate to reducing the temperature variation.

For at least the foregoing reasons, Applicants' independent claims 1 and 9 are allowable over the Kumar et al. patent. The remaining claims depend from respective independent claim and recite additional advantageous features which further distinguish over the documents relied upon by the Examiner. As such, the present application is considered in condition for allowance.

All objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that the application is in condition for allowance and a Notice of Allowance is respectfully solicited.

Respectfully submitted,

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